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(54) **Rectifier arrangement of alternator for vehicle**

Kraftfahrzeuggenerator-Gleichrichteranordnung

Arrangement de redresseur pour véhicule automobile

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Description

CROSS REFERENCE TO RELATED APPLICATION

[0001] The present invention is based on and claims priority from Japanese Patent specification JP11164537.

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0002] The present invention relates to rectifier arrangement of an alternator to be mounted in a passenger car, a truck or the like.

2. Description of the Related Art

[0003] In order to reduce vehicle running resistance and to increase the passenger compartment, the engine compartment has been reduced less and less recently. Accordingly, temperature in the engine compartment and temperature of an electric device such as an alternator has become higher. Moreover, as a vehicle has been equipped with various safety devices, the output power of the alternator has increased. This has narrowed the space of the engine compartment. Thus, it is necessary to provide an alternator generating higher power without increase in the body size thereof.

[0004] On the other hand, as the engine has become more powerful and compact, vibration of the engine has increased. Thus, a vehicle is required to provide a compact, powerful, temperature resistant, vibration resistant and inexpensive alternator.

[0005] Fig. 12 illustrates a portion of a conventional alternator having an ordinary rectifier disposed in a space S between frame 100 and metal cover 101. The rectifier is composed of terminal plate 104, plus potential cooling fin 105 (hereinafter referred to as plus fin), bushing 106 and minus potential cooling fin 107 (hereinafter referred to as minus fin). Pipe rivet 103 fastens terminal plate 104, plus 105, bushing 106 and minus fin 107 in this order. Plus fin 105 has plus rectifier elements (not shown), and minus fin 107 has minus rectifier elements. The rectifier elements are fixed to fins 105, 107 respectively by soldering or press-fitting. Metal terminal 110 is molded integrally with terminal plate 104 to form a rectifier circuit and is connected to lead 109 which extends from a stator winding at one end and to one of rectifier elements at the other end. Terminal plate 104 is molded with a thermoplastic resin such as polyphenylene sulfide. Bushing 106 is disposed between two fins 105, 107. Bushing 106 is made of an inexpensive thermosetting resin such as phenolic resin because bushing 106 is not required to be molded with a metal member and is simple in shape. The rectifier is fixed to frame 100 together with cover 101 by bolt 102 that is press-fitted to frame 100 and nut 108. Bolt 102 is inserted into pipe rivet 103 and a mounting hole of cover 101. Thus, plus fin 105 is spaced apart from minus fin 107, frame 100, bolt 102 and cover 101, which are fixed together.

[0006] When ambient temperature and temperature of rectifier in high power operation are high, creep - gradual increase in strain due to viscoelasticity of resin - may take place on thermoplastic terminal plate 104, resulting in that resinous member shrinks in the direction to loosen nut 108. This reduces the fastening force of the rectifier, thereby causing breakdown of the rectifier elements and leads 109 of the stator winding.

[0007] JP-A-6-133509 proposes an improved structure, in which minus rectifier element is press-fitted to frame, thereby omitting a minus fin. A bushing is made of thermoplastic resin such as polyphenylene sulfide to have a rectifier-forming metal terminal molded together.

[0008] Because the axial length of the bushing around the nut is comparatively thick, the strain increases due to the creep to loosen the nut. Because the minus rectifier element is fixed to the frame, cooling air windows can not be formed to be wide enough to cool the plus fin. This accelerates the creep further. The bushing must be provided for each engagement hole to enclose and insulate the plus fin completely. Moreover, because of complexity in shape, tooling cost and manufacturing cost increase. Further, polyphenylene sulfide is generally expensive, thereby increasing material cost.

SUMMARY OF THE INVENTION

[0009] It is a main object of the invention to solve the above-described problems and to provide an inexpensive, heat resistant and vibration resistant alternator for a vehicle.

[0010] According to a main aspect of the invention, a rectifier arrangement of an alternator for a vehicle, a plus-potential cooling-fin disposed in a space inside the alternator at a portion close to the cover, a minus-potential cooling-fin disposed in contact with the frame inside the alternator to be in parallel with the plus-potential cooling-fin, a fastening member fixed to the frame and extending through mounting holes of the cover, plus-potential and minus-potential cooling fins, a cylindrical bushing made of thermosetting resin disposed in a space formed by the cover, the plus-potential cooling-fin and the fastening member. A precise definition of the invention is given in claim 1.

[0011] Because the bushing made of thermosetting resin such as phenol resin is resistant to the creep, loosening of the bolt can be prevented under high ambient temperature, thereby enhancing vibration resistance. Moreover, phenol resin is inexpensive and can be fixed to the cover easily so that assembling work can be simplified and the production cost can be reduced.

[0012] According to another aspect of the invention, the bushing of the rectifier arrangement has a flange having a surface in contact with the plus-potential cooling-fin. When the rectifier is fastened via the bushing,

the plus fin can be insulated and the creep is prevented.

[0013] According to another aspect of the invention, the cover of the rectifier arrangement is made of thermoplastic resin, and the bushing is integral with the cover.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] Other objects, features and characteristics of the present invention as well as the functions of related parts of the present invention will become clear from a study of the following detailed description, the appended claims and the drawings. In the drawings:

Fig. 1 is a cross-sectional view of a main portion of an alternator for a vehicle having a rectifier arrangement according to a first embodiment of the invention;

Fig. 2 is a cross-sectional view of portions around the rectifier arrangement according to the first embodiment;

Fig. 3 is a perspective view of the cover with bushings being fixed thereto;

Fig. 4A is a front view illustrating a bushing in the rectifier arrangement according to the first embodiment, and Fig. 4B is a cross-sectional view thereof;

Fig. 5A is a front view illustrating a variant of the bushing, and Fig. 5B is a cross-sectional view thereof;

Fig. 6A is a front view illustrating another variant of the bushing, and Fig. 6B is a cross-sectional view thereof;

Fig. 7 is a cross-sectional view of another variant of the bushing;

Fig. 8 is a front view of a bushing of a rectifier arrangement according to a second embodiment of the invention;

Fig. 9 is a schematic cross-sectional view for explaining a method of fixing the bushing and cover of a rectifier arrangement according to a third embodiment;

Fig. 10A is a front view illustrating a bushing of a rectifier arrangement according to a fourth embodiment, and Fig. 10B is a cross-sectional view thereof;

Fig. 11 is a front view illustrating a cover of a rectifier arrangement according to a fifth embodiment; and

Fig. 12 is a cross-sectional view illustrating a portion around a conventional rectifier arrangement.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[First Embodiment]

[0015] A rectifier arrangement according to a first embodiment of the present invention is described with reference to Figs. 1-4.

[0016] Alternator 1 to be mounted in a vehicle has stator 2, rotor 3, rear and front frames 4, 5 for supporting the rotor and stator. Rotor 3 rotates together with shaft 6 and has a pair of pole cores 31, cooling fans 32, a field coil 33 and slip rings 34. Alternator 1 is driven by an engine (not shown) mounted in a vehicle through shaft 6 and pulley 7 connected to shaft 7. When field coil 33 is energized through slip rings 34, ac power is generated in stator coil 21 and is supplied to full-wave rectifier 10 through lead wires 19 to be converted into dc power.

[0017] Full-wave three-phase rectifier 10 is a bridge circuit composed of three or four pairs of plus and minus elements and cooling fins 15, 17. Minus fin 17 is disposed to be in contact with a portion of rear frame 4. Plus fin 15 is disposed on the side of cover 11 in parallel with minus fin 17. Terminal plate 14 has metal terminals insert-molded therein and is interposed between plus and minus fins 15, 17 to insulate the same. The metal terminals are connected to lead wires 19 of stator coil 21 and terminals of the rectifier elements to form a portion of the bridge circuit. All the metal terminals of terminal plate 14 are molded together with thermoplastic resin such as polyphenylene sulfide that is good in moldability, size-accuracy, heat resistance, weather resistance and dielectric strength. Rear frame 4 has cooling air windows 4a at portions (not shown) spaced apart from rear frame 4.

[0018] Cover 11, plus and minus fins 15, 17 and terminal plate 14 respectively have three mounting holes (only one is shown in Fig. 1) formed in the corresponding portions thereof to be mounted to frame 4 so that rectifier 10 can be fixed by bolts 12. Bolts 12 are press-fitted to rear frame 4 at one end. Then, the mounting holes of cover 11 are respectively fitted to bolts 12 and fastened by nuts 18 from outside in the axial direction. Cover 11 is made of inexpensive thermoplastic resin such as nylon. A plurality of bushings 16 are molded in cover 11 to extend toward rear frame 4 as shown in Fig. 3. Each of bushings 16 has cylindrical portion interposed between bolt 12 and the inner periphery of the mounting hole of plus fin 15 and terminal plate 14 as shown in Fig. 2. Bushings 16 are made of thermosetting resin such as phenol resin and formed as shown in Figs. 4A and 4B. Bushing 16 also has an inner flange 16b that is larger in outside diameter than the inside diameter of the mounting hole of plus fin 15 and an outer flange 16c that has outside surface 16d for nut 18 to be seated thereon. When nut 18 is fastened, end surface 16e of inner flange 16b presses plus fin 15 in the axial direction to fix plus fin 15, terminal plate 14 and minus plate 17 to rear frame 4. Because the end surface of inner flange 16b abuts on plus fin 15, the end surface of bushing 16 is spaced apart from minus fin 17 as shown in Fig. 2. Straight cut portions 16g, 16k are formed on the outer periphery of outer and inner flanges 16c, 16b so that bushing 16 can be prevented from rotating when nut 18 is screwed up. Outer flange 16c has contact surface area larger than contact surface area of nut 18.

[0019] As described above, bushing 16, which provides insulation and receives fastening force in the axial direction, is made of thermosetting resin such as phenol resin. Therefore, the creep under high ambient temperature and the loosening of nuts can be prevented. Moreover, inexpensive phenol resin can be used, and the bushing can be inert-molded in cover 11 to make assembling work easy.

[0020] Inner flange 16b can have semi-cylindrical metal member 16f on the periphery thereof as shown in Fig. 5. Metal member 16f can be inserted when bushing 16 is formed, or can be press-fitted after bushing is formed if it is provided with a shrink range. This strengthen bushing in the axial direction, thereby preventing the creep and bolt-loosening and increasing vibration resistance. This structure also prevents the bushing from cracking even if the nut is screwed up excessively. Metal member 16f can be formed into a C-shape as shown in Fig. 6 or can have a flange to be in contact with plus fin 15 as shown in Fig. 7.

[Second Embodiment]

[0021] A plurality of projection members 16j for partially pressing plus fin 15 as shown in Fig. 8 can be substituted for the annular flange. This can reduce material for bushing 16.

[Third Embodiment]

[0022] As shown in Fig. 9, holes 16h of outer flange 16c and projections 11a of cover 11 can be fitted together and thermally bonded. It is possible to fix each other by soldering or adhesive agent. This can omit insert molding and simplify mold dies and working process with inexpensive equipment. As far as the outer periphery is non-circular such as elliptic or polygonal, the rotation can be prevented. Even if the outer periphery is circular, the rotation can be prevented by a hole formed at a peripheral portion of outer flange 16c to be filled with resinous material when cover 11 is molded.

[Fourth Embodiment]

[0023] As shown in Figs. 10A and 10B, bushing that has only inner flange 16b can be applied if inner flange 16b has a sufficient surface area to support nut 108 and a rotation locking portion 16k is formed on the outer periphery of inner flange 16b.

[Fifth Embodiment]

[0024] As shown in Fig. 11, a plurality of bushings 16 and a portion (sub-cover) 111 of cover 11 are integrally formed from thermosetting resin and is fixed together with the rest 112 of the cover. In this case, the positioning of bushings 16 can be carried out more precisely. Therefore, assembling error of cover 11 can be reduced. Moreover, a plurality of bushings 16 can be put together, and the number of parts and production cost can be reduced.

[0025] Bushing 16 and cover 11, altogether, can be formed from thermosetting resin, so that the number of parts and production steps can be reduced.

[0026] It is also possible that female screws are formed in frame 4 directly to have the bolts screwed therein. Thus, the number of parts and manufacturing steps can be reduced.

[0027] In the foregoing description of the present invention, the invention has been disclosed with reference to specific embodiments thereof. It will, however, be evident that various modifications and changes may be made to the specific embodiments of the present invention without departing from the scope of the appended claims. Accordingly, the description of the present invention in this document is to be regarded in an illustrative, rather than restrictive, sense.

Claims

1. A rectifier arrangement (10) of an alternator (1) for a vehicle including a frame (4, 5) and a cover (11) fixed to said frame (4, 5) for covering said rectifier arrangement (10) is **characterized** to comprise:

   a plus-potential cooling-fin (15) having a mounting hole disposed in a space between said cover (11) and said frame (4, 5) at a portion close to said cover (11);
   a minus-potential cooling-fin (17) having a mounting hole disposed in said space in contact with said frame (4, 5) in parallel with said plus-potential cooling-fin (15);
   a fastening member (12, 18), fixed to said frame (4, 5) and extending through said mounting holes of said plus-potential and minus-potential cooling fins (15, 17), for fastening cover (11), said plus-potential and minus-potential cooling-fins (15, 17); and
   a bushing (16) made of thermosetting resin disposed in a space formed by said cover (11), said plus-potential cooling-fin (15) and said fastening member (12, 18) to insulate said plus-potential cooling-fin (15) from said fastening member (12, 18).

2. The rectifier arrangement (10) as claimed in claim 1 **characterized in that**

   said bushing (16) has a flange (16b, 16c) having a surface in contact with said plus-potential cooling-fin (15), said flange (16b, 16c) has an outside diameter larger than a diameter of said mounting hole of said plus-potential cooling-fin (15).

3. The rectifier arrangement (10) as claimed in claim 1 or 2 **characterized in that**

said cover (11) is made of thermoplastic resin, and
said bushing (16) is integral with said cover (11).

4. The rectifier arrangement (10) as claimed in claim 3 **characterized in that**

an end surface of said bushing (16) is exposed to the outside of said cover (11).

5. The rectifier arrangement (10) as claimed in claim 4 **characterized in that**

said end surface is larger in diameter than a minimum diameter of contact surface of said fastening member (12, 18).

6. The rectifier arrangement (10) as claimed in any one of claims 3-5 **characterized in that**

said bushing (16) has a cut portion (16g, 16k) to be locked by said cover (11).

7. The rectifier arrangement (10) as claimed in claim 1 or 2 **characterized in that**

said cover (11) comprises a member (111) made of thermosetting-resin-made having said bushing (16) integral therewith.

8. The rectifier arrangement (10) as claimed in claim 1 or 2 **characterized in that**

said bushing (16) and said cover (11) are molded together with thermosetting resin.

9. The rectifier arrangement (10) as claimed in any one of claims 1-8 **characterized in that**

said bushing (16) comprises a cylindrical metal member (16f) inserted therein.

Patentansprüche

1. Gleichrichteranordnung (10) eines Generators (1) für ein Fahrzeug, mit einem Rahmen (4.5) und einem an dem Rahmen (4, 5) befestigten Deckel (11) zum Abdecken der genannten Gleichrichteranordnung (10), **dadurch gekennzeichnet, daß** sie folgendes enthält:

eine Pluspol-Kühlfahne (15), die eine Befestigungsbohrung aufweist und in dem Raum zwischen dem Deckel (11) und dem Rahmen (4, 5) in einem Bereich nahe an dem Deckel (11) angeordnet ist;

eine Minuspol-Kühlfahne (17), die eine Befestigungsbohrung aufweist und in dem genannten Raum in Berührung mit dem Rahmen (4, 5) sowie parallel zu der Pluspol-Kühlfahne (15) angeordnet ist;

ein Befestigungsteil (12, 18), das an dem Rahmen (4, 5) befestigt ist und sich durch die Befestigungsbohrungen der Pluspol-Kühlfahne und der Minuspol-Kühlfahne (15, 17) erstreckt, um den Deckel (11), die Pluspol-Kühlfahne und die Minuspol-Kühlfahne (15, 17) zu befestigen; und

eine Buchse (16), die aus thermisch aushärtendem Harz gebildet ist und in dem durch den Deckel (11), die Pluspol-Kühlfahne (15) und das Befestigungsteil (12, 18) gebildeten Raum angeordnet ist, um die Pluspol-Kühlfahne (15) gegenüber dem Befestigungsteil (12, 18) zu isolieren.

2. Gleichrichteranordnung (10) nach Anspruch 1, **dadurch gekennzeichnet, daß**

die genannte Buchse (16) einen Flunsch (16b, 16c) mit einer Oberfläche aufweist, die sich in Berührung mit der Pluspol-Kühlfahne (15) befindet, wobei der genannte Flunsch (16b, 16c) einen Außendurchmesser aufweist, der größer als ein Durchmesser der Befestigungsbohrung der Pluspol-Kühlfahne (15) ist.

3. Gleichrichteranordnung (10) nach Anspruch 1 oder 2, **dadurch gekennzeichnet, daß**

der genannte Deckel (11) aus einem thermisch aushärtenden Harz hergestellt ist und daß die genannte Buchse (16) einstückig mit dem Dekkel (11) ausgeführt ist.

4. Gleichrichteranordnung (10) nach Anspruch 3, **dadurch gekennzeichnet, daß**

eine Endfläche der genannten Buchse (16) zu der Außenseite des Deckels (11) freiliegt.

5. Gleichrichteranordnung (10) nach Anspruch 4, **dadurch gekennzeichnet, daß**

die genannte Endfläche größeren Durchmesser hat als ein kleinster Durchmesser der Kontaktfläche des Befestigungsteils (12, 18).

6. Gleichrichteranordnung (10) nach irgendeinem der Ansprüche 3 bis 5, dadurch gekennezeichnet, daß

die genannte Buchse (16) einen ausgeschnittenen Bereich (16g, 16k) zur Festlegung durch den Deckel (11) aufweist.

7. Gleichrichteranordnung (10) nach Anspruch 1 oder 2, **dadurch gekennzeichnet, daß**

der Deckel (11) ein Bauteil (111) aufweist, das aus thermisch aushärtendem Harz gebildet ist und das einstückig mit der genannten Buchse (16) ausgebildet ist.

8. Gleichrichteranordnung (10) nach Anspruch 1 oder 2, **dadurch gekennzeichnet, daß**

die genannte Buchse (16) und der Deckel (11) zusammen als Gußformteil aus thermisch aushärtendem Harz gebildet sind.

9. Gleichrichteranordnung (10) nach irgendeinem der Ansprüche 1 bis 8, **dadurch gekennzeichnet, daß**

die genannte Buchse (16) ein darin eingesetztes zylindrisches Metallteil (16f) enthält.

Revendications

1. Agencement de redresseur (10) d'un alternateur (1) destiné à un véhicule comprenant un bâti (4, 5) et une protection (11) fixée audit bâti (4, 5) en vue de recouvrir ledit agencement de redresseur (10), **caractérisé** pour comprendre :

une ailette de refroidissement du potentiel positif (15) comportant un trou de montage disposé dans un espace entre ladite protection (11) et ledit bâti (4, 5) au niveau d'une partie proche de ladite protection (11),
une ailette de refroidissement du potentiel négatif (17) comportant un trou de montage disposé dans ledit espace en contact avec ledit bâti (4, 5) de façon parallèle à ladite ailette de refroidissement du potentiel positif (15),
un élément de fixation (12, 18), fixé audit bâti (4,5) s'étendant à travers lesdits trous de montage desdites ailettes de refroidissement du potentiel positif et du potentiel négatif (15, 17), destiné à fixer la protection (11), lesdites ailettes de refroidissement du potentiel positif et du potentiel négatif (15, 17), et
un manchon isolant (16) fait d'une résine thermodurcissable disposé dans un espace formé par ladite protection (11), ladite ailette de refroidissement du potentiel positif (15) et ledit élément de fixation (12, 18) afin d'isoler ladite ailette de refroidissement du potentiel positif (15) dudit élément de fixation (12, 18).

2. Agencement de redresseur (10) selon la revendication 1 **caractérisé en ce que**

ledit manchon isolant (16) comporte une collerette (16b, 16c) comportant une surface en contact avec ladite ailette de refroidissement du potentiel positif (15), ladite collerette (16, 16c) présente un diamètre extérieur plus grand qu'un diamètre dudit trou de montage de ladite ailette de refroidissement du potentiel positif (15) ;

3. Dispositif de redresseur (10) selon la revendication 1 ou 2 **caractérisé en ce que**

ladite protection (11) est faite d'une résine thermodurcissable, et
ledit manchon isolant (16) est intégré à ladite protection (11).

4. Agencement de redresseur (10) selon la revendication 3 **caractérisé en ce que**

une surface d'extrémité dudit manchon isolant (16) est exposée à l'extérieur de ladite protection (11).

5. Agencement de redresseur (10) selon la revendication 4 **caractérisé en ce que**

ladite surface d'extrémité présente un diamètre plus grand qu'un diamètre minimum d'une surface de contact dudit élément de fixation (12, 18).

6. Agencement de redresseur (10) selon l'une quelconque des revendications 3 à 5 **caractérisé en ce que**

ledit manchon isolant (16) présente une partie coupée (16g, 16k) devant être bloquée par ladite protection (11).

7. Agencement de redresseur (10) selon la revendication 1 ou 2, **caractérisé en ce que**

ladite protection (11) comprend un élément (111) fait d'une résine thermodurcissable comportant ledit manchon isolant (16) intégré à celui-ci.

8. Agencement de redresseur (10) selon la revendication 1 ou 2 **caractérisé en ce que**

ledit manchon isolant (16) et ladite protection (11) sont moulés ensemble avec la résine thermodurcissable.

9. Agencement de redresseur (10) selon l'une quelconque des revendications 1 à 8, **caractérisé en ce que**

ledit manchon isolant (16) comprend un élément métallique cylindrique (16f) inséré dans celui-ci.

FIG. 1

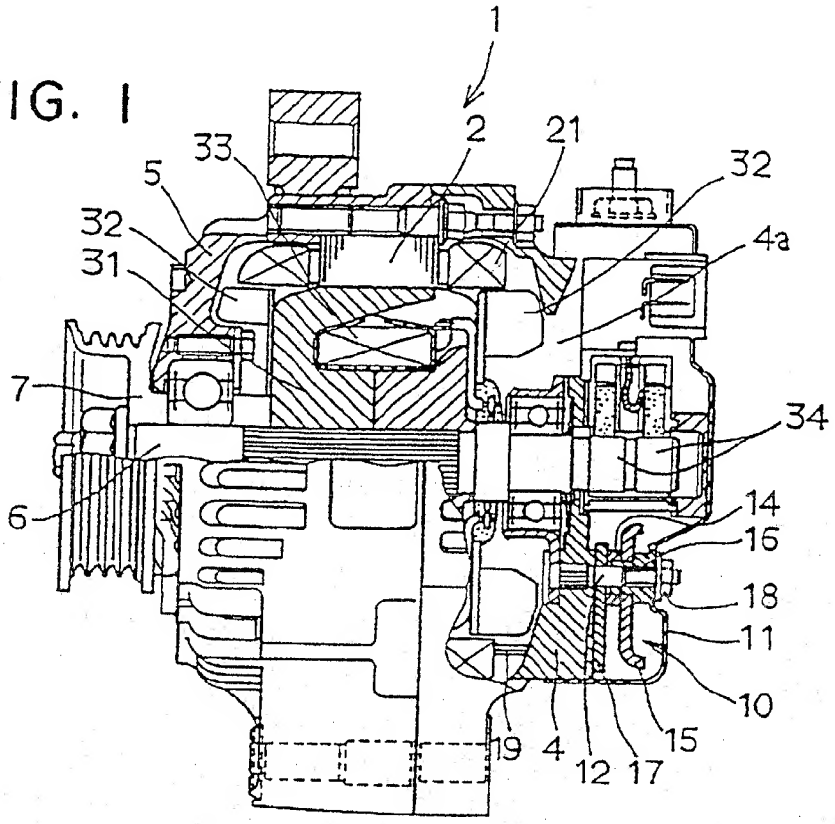

1
2
21
33
5
32
31
32
4a
7
34
6
14
16
18
11
10
19
4
12
17
15

FIG. 2

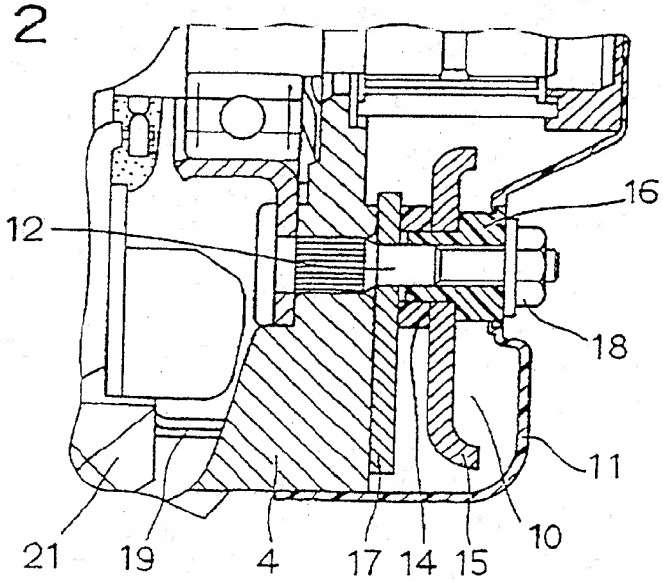

16
12
18
11
21
19
4
17
14
15
10

FIG. 3

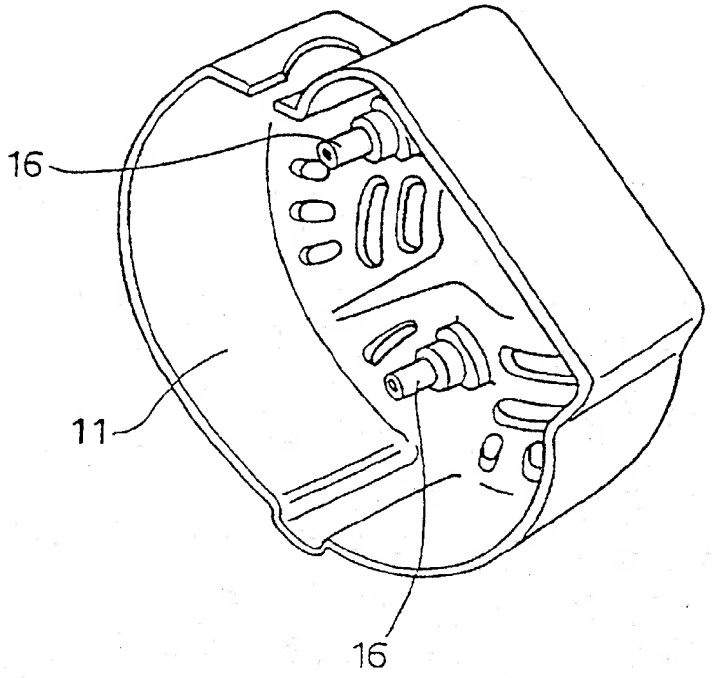


FIG. 4A

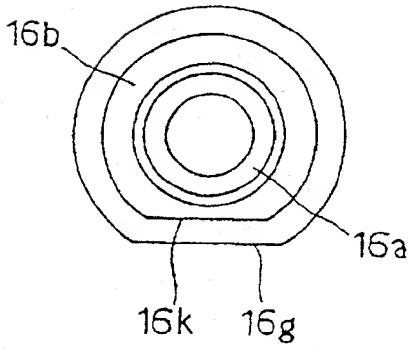


FIG. 4B

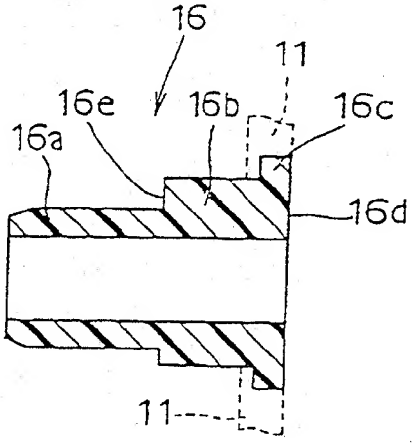


FIG. 5A

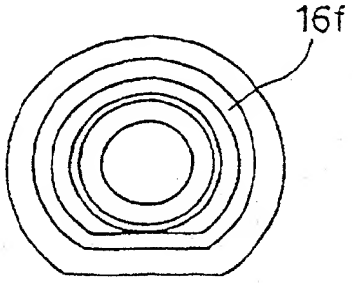


FIG. 5B

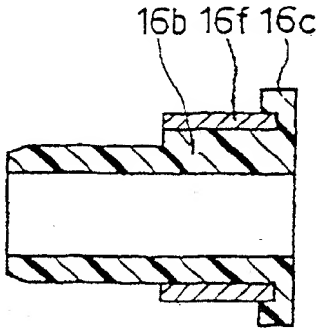


FIG. 6A

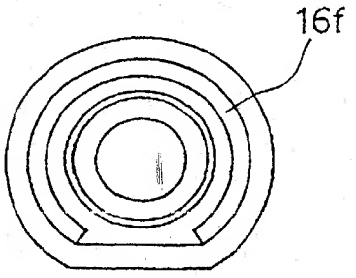


FIG. 6B

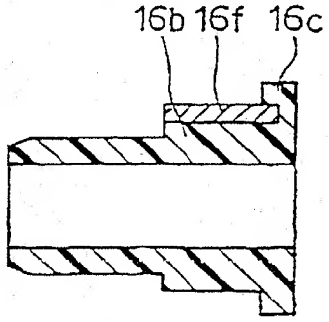


FIG. 7

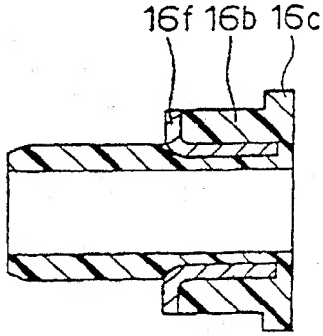


FIG. 8

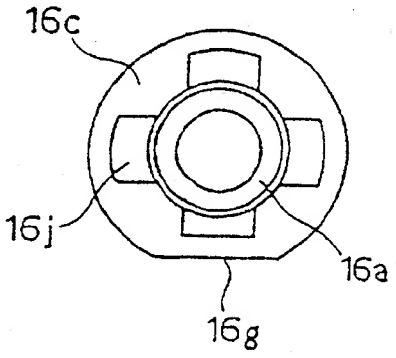


FIG. 9

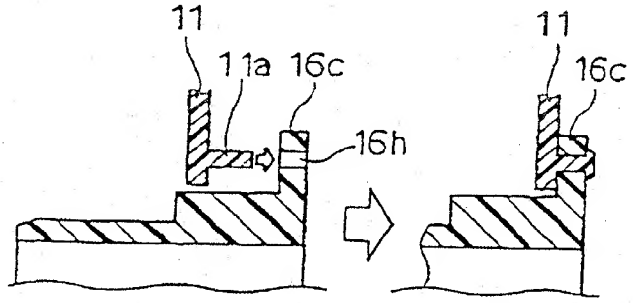


FIG. 10A

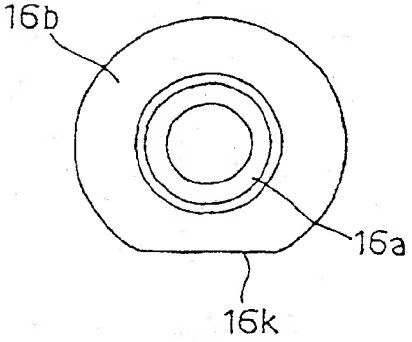


FIG. 10B

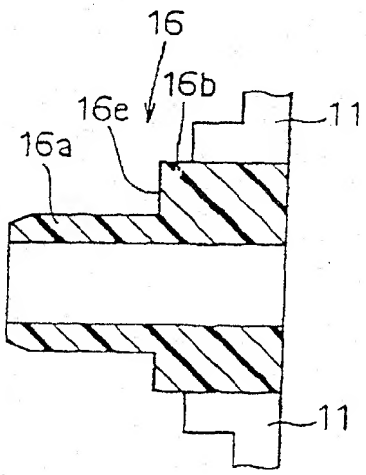


FIG. 11

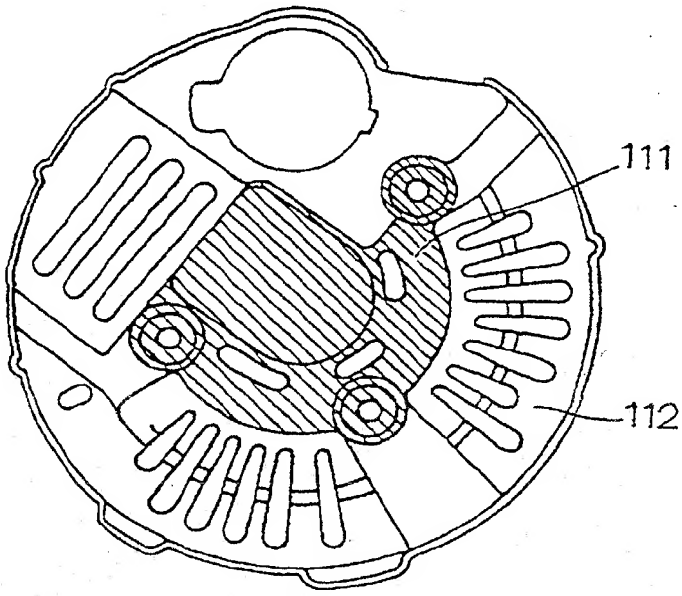
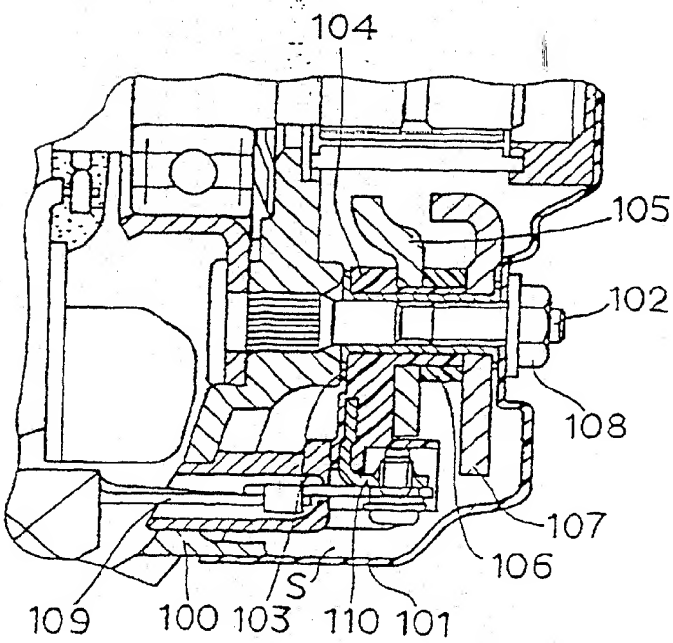


FIG. 12
PRIOR ART



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Patent Abstracts of Japan

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PUBLICATION DATE : 12-02-91

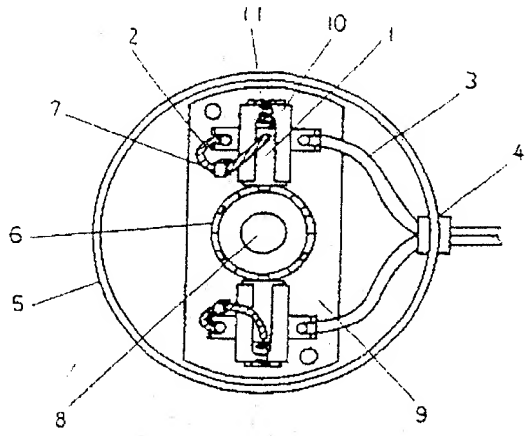
APPLICATION DATE : 28-06-89
APPLICATION NUMBER : 01165894

APPLICANT : MATSUSHITA ELECTRIC IND CO LTD;

INVENTOR : KONDO YASUHIRO;

INT.CL. : H02K 13/00 C23F 13/00

TITLE : INTANK MOTOR



ABSTRACT : PURPOSE: To prevent electrolytic corrosion of a motor even when the motor is immersed in alcohol fuel by securing a metal having higher ionization tendency than the composition metal of motor, as a sacrificial anode material, with the metallic part of the motor.

CONSTITUTION: A brush spring 11 and a carbon brush 1 are contained in a brush box 10 secured to a brush holder 9 arranged in a motor frame 5 and the carbon brush 1 is pushed against a commutator 6 by means of the brush spring 11. A flexible conductor pigtail 2 is secured to the carbon brush 1 and a sacrificial anode material 7 having higher ionization tendency than that of the metal composing the brush box 10, the commutator 6 or the pigtail 2 is secured to the pigtail 2.

⑲日本国特許庁（JP）　⑪特許出願公開

⑫公開特許公報（A）　平3－32340

⑤1Int. Cl.⁵	識別記号	庁内整理番号
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C 23 F 13/00	P	7179－4K

⑬公開　平成3年(1991)2月12日

審査請求　未請求　請求項の数 1　(全3頁)

⑤4発明の名称　インタンクモータ

⑳特　願　平1－165894
㉒出　願　平1(1989)6月28日

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明　細　書

1、発明の名称

インタンクモータ

2、特許請求の範囲

モータの金属部に、モータを構成する金属よりイオン化傾向の大きい金属を犠牲陽極材として接続固定させたインタンクモータ。

3、発明の詳細な説明

産業上の利用分野

本発明は、燃料供給用として燃料タンク内に配設されるインタンクモータに関し、特に整流子モータ内の一部に電食対策をしたインタンクモータに関する。

従来の技術

近年、自動車等の内燃機関の燃料供給装置として、燃料タンク内にモータを設置したインタンクモータが用いられている。一方、省資源のために、燃料がガソリンからアルコールに代わる自動車等の内燃機関の開発が進められており、この燃料供給装置としてのインタンクモータの開発が必要となっている。

以下に従来のガソリン用インタンクモータについて説明する。

第2図は、従来のインタンクモータの要部構造図であり、モータフレーム16内に配設固定されたブラシホルダ19に固定されるブラシ箱20の内部に、ブラシばね21とカーボンブラシ12が移動可能な様に収納され、前記ブラシばね21によりカーボンブラシ12を整流子17に押圧付勢している。前記カーボンブラシ12には、可撓性の導電線ピグティル13が固着され、ブラシ箱20に供給される電源をカーボンブラシ12を通じ整流子17に供給している。

発明が解決しようとする課題

しかしながら、上記の従来の構成ではアルコール燃料に浸漬されると、モータ内部のブラシ箱や整流子またはピグティル等の金属部が電食作用により腐食し、モータの機能を著しく低下させるという問題を有していた。

本発明は上記従来の問題点を解決するもので、

アルコール燃料に浸漬した場合にも電食を防止できるインタンクモータを提供することを目的とする。

課題を解決するための手段

この目的を達成するために本発明のインタンクモータは、モータを構成する金属よりイオン化傾向の大きい金属を犠牲陽極材としてモータの金属部に接続させたものである。

作用

この構成によって、アルコールに浸漬された場合にも整流子，ピグテイル，ブラシ箱等の金属部分に防食電流が流れるため、電食対策を施すことが可能となり、モータの高信頼性，長寿命を保証することができる。

実施例

以下、本発明の一実施例について図面を参照しながら説明する。

第１図は、本発明の一実施例におけるインタンクモータのピグテイル部に犠牲陽極材を接続させた構成図を示すものである。第１図において、モ

ータフレーム５内に配設固定されたブラシホルダ９に固定されるブラシ箱１０の内部に、ブラシばね１１とカーボンブラシ１が移動可能な様に収納され、前記ブラシばね１１によりカーボンブラシ１を整流子６に押圧付勢している。前記カーボンブラシ１には可撓性の導電線ピグテイル２が固着され、ブラシ箱１０に供給される電源をカーボンブラシ１を通じ整流子６に供給している。さらに、ピグテイル２には前記ブラシ箱１０や整流子６，ピグテイル２等の金属よりイオン化傾向の大きい犠牲陽極材７を固着している。

以上の様に上記構成によるモータは、アルコール燃料中に浸漬されても、犠牲陽極材７が防食電極となり、イオン化傾向が犠牲陽極材７より小さいブラシ箱１０や整流子６，ピグテイル２等の金属へ防食電流が流れるためマイナス側、すなわちモータを構成している金属を防食する。この犠牲陽極材７は例えば亜鉛合金、マグネシウム合金である。

亜鉛　$E_0V = 0.76$，鉄　$E_0V = -0.44$，

マグネシウム　$E_0V = -2.34$

E_0Vとは電気化学の基準電位である水素電位（H^+/H）を０Ｖとした値であり、E_0Vが小さいほどイオン化傾向が高いことを示す。また、犠牲陽極材７は、モータ内部の金属上であればどの位置に固着していてもよい。

発明の効果

以上のように本発明は、インタンクモータ内部の金属の一部分に、モータ構成金属よりイオン化傾向の大きい金属を固着することにより、アルコール燃料にモータが浸漬された際でも、モータを構成している金属すべてを極めて簡単かつ安価な方法で防食することができ、高信頼性，長寿命が保証できる優れた燃料供給用インタンクモータを実現できるものである。

4．図面の簡単な説明

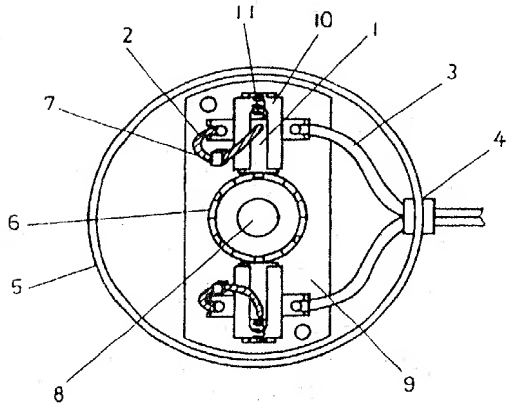
第１図は本発明の一実施例における、ピグテイル部に犠牲陽極材を固着したインタンクモータの構成図、第２図は従来のインタンクモータの構成図である。

１……カーボンブラシ、２……ピグテイル、３……リード線、４……リード線引出し口、５……モータフレーム、６……整流子、７……犠牲陽極材、８……シャフト、９……ブラシホルダー、１０……ブラシ箱、１１……ブラシばね。

代理人の氏名　弁理士　栗野重孝　ほか１名

1---カーボンブラシ
2---ピグテイル
5---モータフレーム
6---整流子
7---磁性陽極材
9---ブラシホルダー
10---ブラシ箱
11---ブラシばね

第 1 図



第 2 図